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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/799,307	03/12/2004	Jae-Hyun Kim	8054-50 (LW9007US/HJ)	8101
22150	7590	12/15/2006	EXAMINER	
F. CHAU & ASSOCIATES, LLC 130 WOODBURY ROAD WOODBURY, NY 11797			CHIEN, LUCY P	
			ART UNIT	PAPER NUMBER
			2871	

DATE MAILED: 12/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/799,307

Applicant(s)

KIM ET AL.

Examiner

Lucy P. Chien

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 21-25 is/are allowed.
- 6) ☒ Claim(s) 1-3, 6-17, 19 and 20 is/are rejected.
- 7) ☒ Claim(s) 4, 5 and 18 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 March 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☒ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |                                                                                                                       |                                                                                        |
|-----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                           | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)            |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date ____ | 6) <input type="checkbox"/> Other: ____                                                |

## DETAILED ACTION

### *Response to Arguments*

Applicant's arguments with respect to claim 1-25 have been considered but are moot in view of the new ground(s) of rejection.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claim 1,2,6,7,17,19** are rejected under 35 U.S.C. 103(a) as being unpatentable over Park et al (US 6522376) in view of Nakashima et al (US 6774965).

#### *Regarding Claim 1,17,*

Park et al discloses in Figure 5 and (Column 3 Row 64-67 and Column 4 Row 1-16) a substrate (1) a switching device formed in a pixel area defined by a gate line (52) and a source line (62), the gate line (52) extended in a first direction (Figure 4 (50) horizontal) and arranged in a second direction (Figure 4, (52) substantially perpendicular to the first direction, the source line (62) extended in the second direction (Figure 4, 62, vertically) and arranged in the first direction, the switching device having a gate electrode ((52) also in (Figure 4 (52))) extended from the gate line (52), a source electrode (62) extended from the source line (62) and a drain electrode (64) spaced apart from the source electrode (62). A pixel electrode (70) connected to the drain

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electrode (64) and a reflecting plate (68) formed on the pixel electrode (70) and a transmitting area (72) through which an artificial light is transmitted,

Park et al does not disclose the reflecting plate having a first edge extended to the transmitting area. Also, where the pixel electrode has a first height at the reflecting area and a second height at the transmitting area wherein the first height is greater than the second height with respect to the substrate.

Nakashima et al (Fig. 9) discloses the reflecting plate (10,11) having a first edge extended to the transmitting area to avoid alignment defect of liquid crystals due to a difference in level on the organic layer which decreases display quality (Column 8, rows 13-25) Also, the pixel electrode has a first height at the reflecting area and a second height at the transmitting area wherein the first height is greater than the second height with respect to the substrate such that incident rays of light have the same efficiency for the transmissive and reflective modes.

It would have been obvious to one of ordinary skill in the art, at the time of the invention to combine Park et al's display to include Nakashima et al's reflecting plate having a first edge extended to the transmitting area to improve reflectivity and a first height being greater than the second height motivated by the desire avoid alignment defect of liquid crystals due to a difference in level on the organic layer which decreases display quality (Column 8, rows 13-25).

Regarding Claim 2, In addition to Park et al and Nakashima et al as disclosed above, Park et al Figure 5 discloses an organic insulating layer (labeled in figure 6 (84) as benzocyclobutene which is organic) formed in the reflecting area with a contact hole

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(66) through which the drain electrode (64) is partially exposed; and an inter-insulating layer (86) formed on the pixel electrode (70) connected to the drain electrode (64) through the contact hole (66) wherein the reflecting plate (68) is formed on the inter-insulating layer (86).

Regarding Claim 6 and 7, In addition to Park et al and Nakashima et al as disclosed above, Park et al Figure 4 (Page 8 of this action) shows the width of the pixel electrode in the first direction is smaller than the width of the pixel area in the first direction. And the width of the pixel electrode in the first direction and width of the pixel electrode in the second direction are smaller than a width of the pixel area in the first direction and a width of the pixel area in the second direction.

Regarding Claim 19.

In addition to Park et al and Nakashima et al as disclosed above. Park et al discloses a second substrate (106) having a color pixel (104) on the second substrate. And the liquid crystal layer (100) between the second (106) and first substrate (108).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

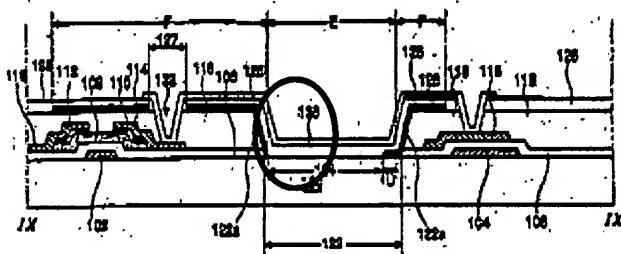
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**Claim 3** is rejected under 35 U.S.C. 103(a) as being unpatentable over Park et al (US 6522376) and of Nakashima et al (US 6774965), in view of Ha et al (US 6704081)

Including Park et al and Nakashima et al as disclosed above.

Park et al and Nakashima et al do not disclose the second edge of the reflecting area adjacent to the transmitting area removed by a predetermined width toward the extended direction of the first edge.

Ha et al discloses in Figure 9D the second edge (circled below) edge removed from the transmitting area thus the distortion from a fringe field can be prevented. And the transmissive area is widened as shown. (Column 12, Row 49-60)



It would have been obvious to one of ordinary skill in the art, at the time of the invention to combine the teaching of Park et al's display device and Nakashima et al to include Ha's teachings of having one side of the transmissive part overlapped in order to prevent distortion from a fringe field. (Ha et al, Column 12, Row 49-60)

**Claim 8-11,15,16** are rejected under 35 U.S.C. 103(a) as being unpatentable over Park et al (US 6522376) and of Nakashima et al (US 6774965) in view of Baek et al (US 20020036730).

Regarding Claim 8,

In addition to Park et al and Nakashima et al as disclosed above, Park et al further discloses in Figure 8 an upper substrate (106) having a color pixel (104). And the liquid crystal layer (100) between the upper (106) and lower substrate (108).

Park et al and Nakashima et al do not disclose that the color filters corresponding to the reflecting regions have a larger thickness than the transmissive region color filter and wherein the pixel electrode has a first height at the reflecting area and a second height at the transmitting area wherein the first height is greater than the second height with respect to the substrate

Baek et al discloses (Page 3, [0037]) the color filter layer in the transmitting portion is twice as large as the thickness of the color filter in the reflective portion to improve the color purity of the light passing through the color filter in the transmissive region. (Page 2, [0014], [0015]) therefore the pixel electrode has a first height (d3) at the reflecting area and a second height (d4) at the transmitting area wherein the first height is greater than the second height with respect to the substrate.

It would have been obvious to one of ordinary skill in the art, at the time of the invention to combine the teaching of Park et al and Nakashima et al to include Baek et al's color filter thickness to improve the color purity of the light passing through the color filter in the transmissive region. (Baek et al, Page 2, [0014], [0015])

Regarding Claim 9,

In addition to Park et al, Nakashima et al, and Baek et al as disclosed above, Baek et al discloses (Page 3, [0037]) the color filter layer in the transmitting portion (fourth thickness as claimed in claim 9) is twice as large as the thickness of the color

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filter in the reflective portion (third thickness claimed in claim 9) to improve the color purity of the light passing through the color filter in the transmissive region. (Page 2, [0014], [0015]).

Regarding Claim 10,

In addition to Park et al, Nakashima et al, and Baek et al as disclosed above, Park et al in Figure 4 discloses the transmission window (72) is defined by at least three sides of the reflecting plate (68) and all the sides of the reflecting plate (68) is connected to the pixel electrode (70).

Regarding Claim 11,

In addition to Park et al, Nakashima et al, and Baek et al as disclosed above, Park et al in Figure 6 the transmission window is defined by at least three sides (shown in figure 4) of the reflecting plate (68) and a portion of the first side of the three sides and a portion of the second side adjacent to the first side of the three sides (shown in Figure 6) are extended to connect with the pixel electrode (70).

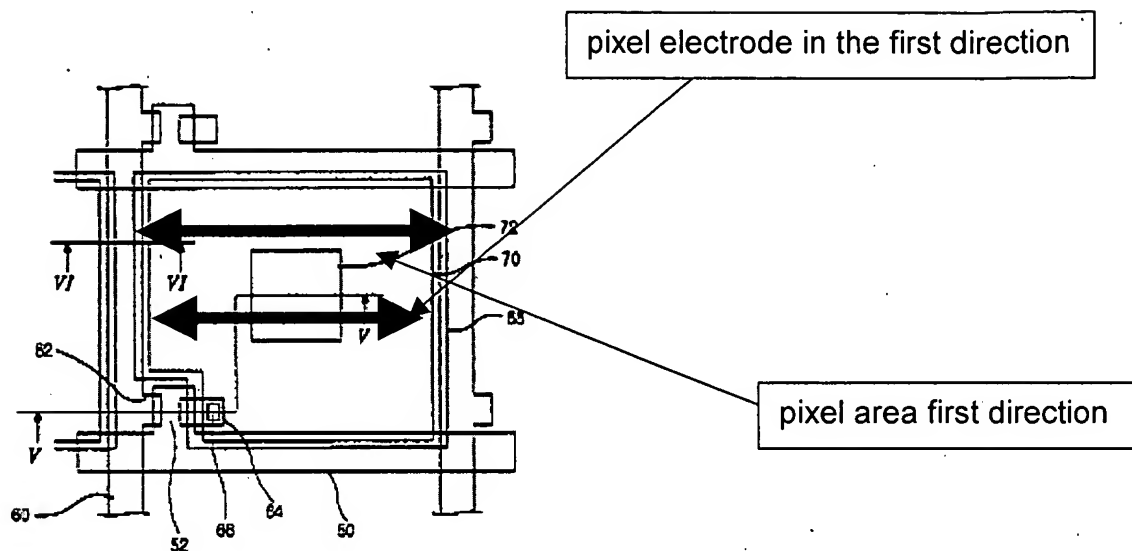
Regarding Claim 15,

In addition to Park et al, Nakashima et al, and Baek et al as disclosed above.

Park et al further discloses in Figure 4 (and figure below) the width of the pixel electrode in the first direction is smaller than the width of the pixel area in the first direction.



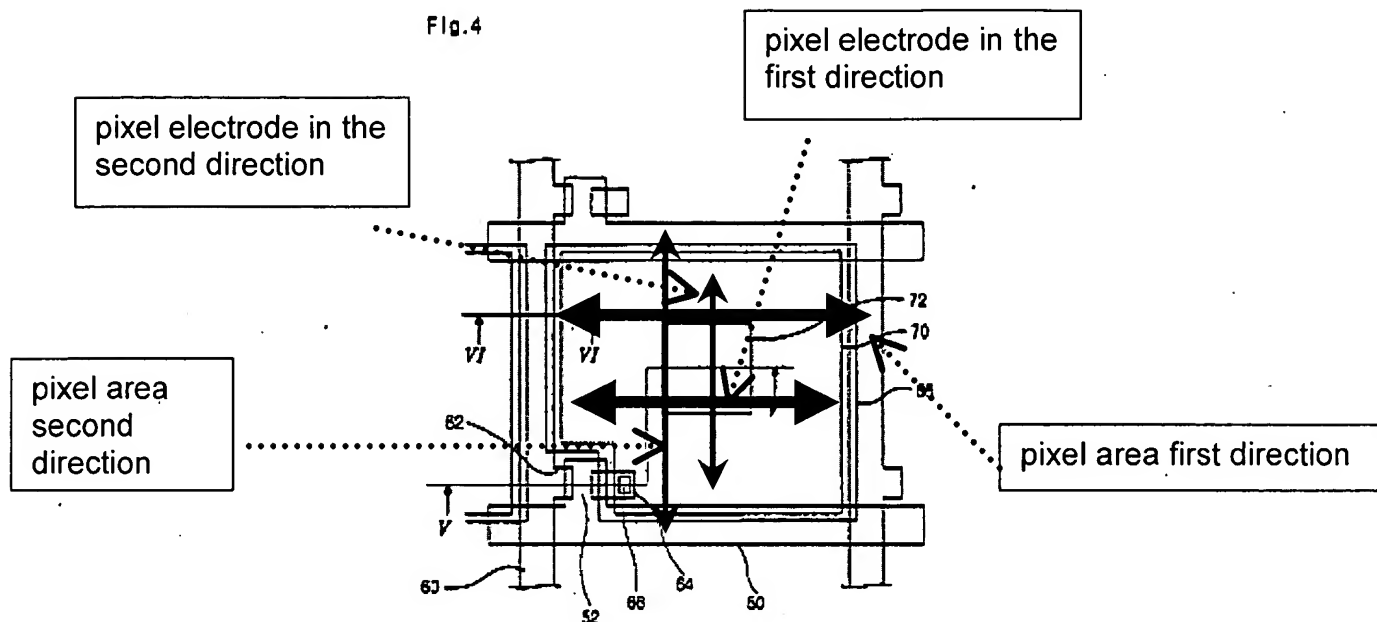
**Fig.4**



Regarding Claim 16,

In addition to Park et al, Nakashima et al, and Baek et al as disclosed above.

Park et al further discloses in Figure 4 (and figure below) the width of the pixel electrode in the first direction and width of the pixel electrode in the second direction are smaller than a width of the pixel area in the first direction and a width of the pixel area in the second direction.



**Claim 12** is rejected under 35 U.S.C. 103(a) as being unpatentable over Park et al (US 6522376) and Nakashima et al (US 6774965) and Baek et al (US 20020036730) in view of Auman et al (US 5856432).

Park et al, Nakashima et al and Baek et al do not disclose either lower (first) or upper (second) substrate further comprising of a rubbed alignment layer.

Auman et al discloses (Column 2, Row 52-59) the rubbing of the alignment layer induces the alignment of the liquid crystal.

It would have been obvious to one of ordinary skill in the art, at the time of the invention to combine the teaching of Park et al, Nakashima et al, and Baek et al's color filter thickness to include the teachings of Auman et al's rubbed alignment layer to induce the alignment of the liquid crystal. (Auman et al, Column 2, Row 52-59)

**Claim 20** is rejected under 35 U.S.C. 103(a) as being unpatentable over Park et al (US 6522376) and of Nakashima et al (US 6774965) in view of Auman et al (US 5856432).

Park et al and Nakashima et al do not disclose either lower (first) or upper (second) substrate further comprising of a rubbed alignment layer.

Auman et al discloses (Column 2, Row 52-59) the rubbing of the alignment layer induces the alignment of the liquid crystal.

It would have been obvious to one of ordinary skill in the art, at the time of the invention to combine the teaching of Park et al and Nakashima et to include the teachings of Auman et al's rubbed alignment layer to induce the alignment of the liquid crystal. (Auman et al, Column 2, Row 52-59)

**Claim 13** is rejected under 35 U.S.C. 103(a) as being unpatentable over Park et al (US 6522376) and Nakashima et al (US 6774965) and of Baek et al (US 20020036730) in view of Ha et al (US 6704081).

Park et al, Nakashima et al and Baek et al do not disclose positioning of the reflecting plate and pixel electrode comprised of L-shapes.

Ha et al discloses in Figure 12 the pixel electrode (230) electrically connected to a reflecting plate (226) comprises an L-shaped when the rubbing direction is -45 degrees. (Column 6 Row 66 and Column 7, Row 1-7) teaches the location of the reflector on the sides of the transmission region is determined by the alignment direction by the rubbing direction. Therefore, it is obvious to have the rubbing direction

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in the desired 10,11,1,2, and 12 o clock to make the L-shape of the area where reflecting plate is connected to the pixel electrode.

It would have been obvious to one of ordinary skill in the art, at the time of the invention modify Park et al, Nakashima et al and Baek et al's color filter thickness to include Ha's rubbing direction to determine the location of the reflector on the side of the transmission area. (Column 6 Row 66 and Column 7, Row 1-7)

**Claim 14** is rejected under 35 U.S.C. 103(a) as being unpatentable over Park et al (US 6522376) and Nakashima et al (US 6774965) and of Baek et al (US 20020036730) in view of Acosta et al (US 20030067575).

Park et al, Nakashima et al and Baek et al do not disclose the rubbing of the alignment layers in different directions to align the liquid crystals in a homogeneous state.

Acosta et al discloses in Figure 1 and (Page 10,11 [0137]) the lower substrate having a first alignment layer rubbed in a first direction and a second alignment layer rubbed in a second direction opposite to the first direction so the liquid crystal layer would be in a stable state.

It would have been obvious to one of ordinary skill in the art, at the time of the invention to combine the teaching of Park et al, Nakashima et al and Baek et al's color filter thickness-to include the teachings of Acosta et al's rubbed alignment layer direction to align the liquid crystal in a stable (homogenous state). (Acosta et al, Page 10,11 [0137])

***Allowable Subject Matter***

**Claim 4,5,18** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

*Regarding Claim 4,5:*

Park et al does not disclose the pixel electrode formed on the insulating layer and connected to the drain electrode through the contact hole being and the first edge extended to the transmitting area is connected to the pixel electrode exposed through the transmitting area and where the second edge of the reflecting are adjacent to the transmitting are is removed toward the direction of the first edges.

*Regarding Claim 18:*

Park et al does not disclose the organic insulating layer formed on the reflecting area with a second contact hole corresponding to the first contact hole so to expose the drain electrode.

**Claim 21-25 are allowed.**

The following is a statement of reasons for the indication of allowable subject matter:

The prior art does not disclose nor does not reasonably a pixel electrode partially formed on the insulating layer, and connected to the drain electrode through the contact

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hole; an organic insulating layer formed on the insulating layer and the pixel electrode in the reflecting area to expose the pixel electrode corresponding to the transmitting area; an inter-insulating layer formed on the organic layer corresponding to the reflecting area; and a reflecting plate disposed on the inter-insulating layer so as to define the reflecting area and the transmitting area, the reflecting plate having a first edge extended to the transmitting area to connect the reflecting plate to the pixel electrode.

Claims 22-25 are dependent on Claim 21 and are therefore are allowable.

It is the examiners opinion that these limitations show novelty over the prior art and are therefore allowable.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lucy P. Chien whose telephone number is 571-272-8579. The examiner can normally be reached on M-F 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on (571)272-1787. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Lucy P Chien  
Examiner  
Art Unit 2871

*Andrew Schechter*  
ANDREW SCHECHTER  
PRIMARY EXAMINER